institute of mine seismology

Mine Seismology Workshop

29-31 July 2015
WA School of Mines - Curtin University of Technology, Kalgoorlie

Wednesday 29 July 10h00 – 17h00
Lectures and Presentations on Active and Passive Seismic Monitoring in Mines
$300, incl lunch and tea/coffee

Wednesday 29 July 19h00
Dinner hosted by Institute of Mine Seismology

Thursday 30 July 09h00 – 15h00
Mine Seismology Consultancy Open Day

Thursday 30 July 09h00 – 16h30
Software Training – Visualisation and Analysis of Seismicity (I)
$200, incl lunch and tea/coffee, for the 2-day course

Friday 31 July 09h00 – 16h30
Software Training – Visualisation and Analysis of Seismicity (II)

For more information on registration please contact
Genevieve.Kingston@IMSeismology.org (0403 125 871)

Programme – Mine Seismology Workshop

Wednesday 29 July 10h00 – 17h00 ***Hobson auditorium, Curtin University of Technology***

10h00 Seismic Hazard: Long, Intermediate and Short term (re-entry) *by* Dr Aleksander J Mendecki

- Introduction: seismic source parameters, magnitude
- Power law and Gutenberg-Richter relation
- Maximum event size
- Probabilities: intermediate and long term
- Short term seismic response to sudden loading
- Seismic response to production blasts to larger events
  - Short term probabilities
  - Ground motion response

11h30 Strong Ground Motion and Ground Motion Hazard *by* Dr Aleksander J Mendecki

- Ground motion at source
- Factors affecting ground motion away from source
- Ground motion characteristics
- Ground Motion Prediction Equation (GMPE)
- Ground motion hazard

13h00 Lunch

14h00 Integration of Stress Modelling and Seismic Data in Vantage *by* Dr Dmitriy A Malovichko

- Stress modelling and post-processing tools
  - Solving models using IMS boundary element code (ISSM)
  - Importing the 3rd party stress data (Map3D, Flac3D)
  - Calculation of principal stresses and modelling parameters
  - Visualisation of results: vectors, meshes and data points
- Modelling of seismicity
  - Simulation of seismicity using Salamon-Linkov approach
  - Analysis of modelled seismicity
- Validation and improvement of numerical stress models using seismic data
  - Stresses vs location and source parameters of events: 3D comparison, correlation plots
  - Stress orientation vs source mechanisms: 3D comparison, stereo-nets, stress inversion
  - Modelled vs observed seismicity

15h30 Tea/Coffee

15h45 In-Mine Seismic *by* Dr Richard A Lynch

- Active Seismic Monitoring:
  - controlled seismic sources
  - stacking, resolution, maximum range
  - cave front tracking, pillar condition monitoring, stress monitoring
- Ambient Seismic Interferometry: theory, applications to mining – S-wave velocities, overall stress levels and damage zone evolution in 4D
- Reflection Seismology: theory, limitations, exploration for new ore bodies and geological discontinuities using sparse seismic arrays with active and passive seismic sources

19h00 – Dinner hosted by Institute of Mine Seismology (Venue to be Confirmed)

Mine Seismology Consultancy Open Day

IMS Team

Thursday 30 July 09h00 – 15h00 ***Curtin University of Technology***

Geotechnical engineers are invited to bring specific mine seismicity problems for free consultancy and advice.

Monitoring Seismicity & System Performance with *Ticker3D* and Seismic Visualisation and Analysis with *Vantage* (2-day course)

Thursday 30 July 09h00 – 16h00 ***Curtin University of Technology*** **&**
Friday 31 July 09h00 – 16h00 ***Curtin University of Technology***

Course Instructors: Dr Dmitriy A Malovichko & Dr Richard A Lynch

Ticker3D

- Initial Configuration
- System Health and Management: health of system components, sensitivity Analysis
- Recent seismicity
- Long term seismicity: event filters; time history; size distribution and other plots; spatial contours of seismicity; spatial clustering
- Production Data Management
- Basic Reports

Vantage

- Interaction with the 3D viewer
- Loading and customising mine plans
- Loading seismic data from IMS Database Server
- Colouring and sizing of events
- Parameter, temporal and spatial filtering of the data
- Displaying source mechanisms
- Analysis in temporal, spatial and parameter domains: time histories; contours (event parameter gridding onto meshes); energy-potency or energy-moment plots; rank statistics of ground motions
- Event size distribution: open-ended and upper-truncated models, maximum size of event, probability table
- Source mechanisms: stereo-net of principals axes, nodal planes and poles, Hudson's source type plot, Frohlich's ternary graph
- Integration tools: ISSM stress models; Importing of the 3rd party stress data (Map3D); Calculation of principal stresses and modelling parameters; Visualisation of results: vectors, meshes and data points, charts; Joint analysis of seismic and numerical modelling data: stereo-nets of principal stresses and principal axes of source mechanisms, Mohr diagram for seismic sources

Attendees with modern laptops will receive a license for Vantage with which to perform hands-on tasks during training and gain experience. Presentation used during the course and the relevant publications will be available in PDF format. Note that in order to run Vantage, we strongly recommend a machine with at least 4GB of RAM and a modern 3D graphics card (NVidia or AMD) with up-to-date drivers installed.